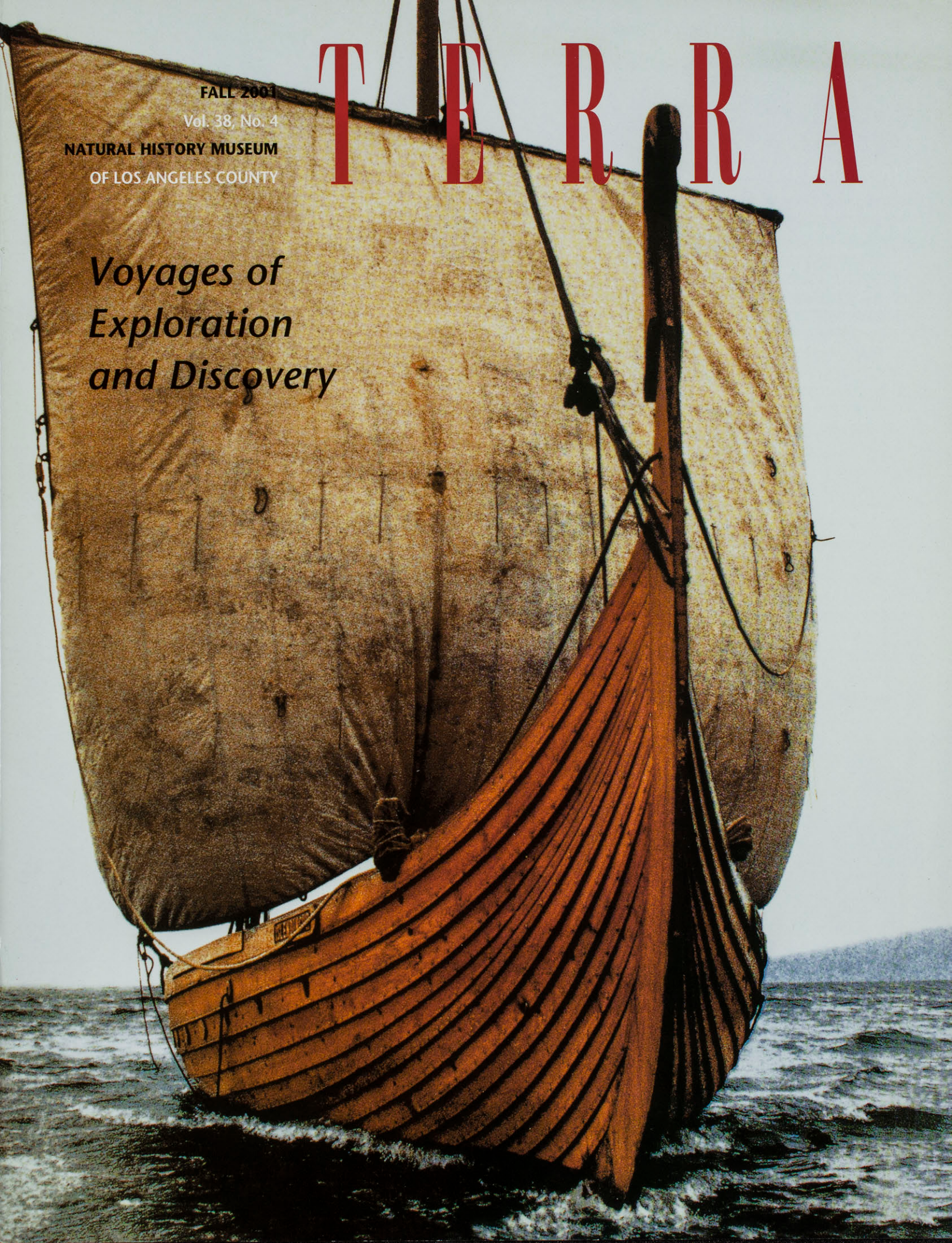


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NATURAL HISTORY MUSEUM
OF LOS ANGELES COUNTY

TERRA

*Voyages of
Exploration
and Discovery*



THIS ISSUE OF TERRA launches an adventurous theme that reflects what is going on throughout the Natural History Museum, in exhibits, research, and planning—*Voyages of Exploration and Discovery*.

Visitors will soon experience “Vikings: The North Atlantic Saga,” a historic look at the explorations of a people whose exploits still influence the lands they visited and who set foot in North America a thousand years ago. “Vikings” will be followed in the spring by “Voyages of Discovery,” the first time treasures of the golden age of natural history exploration have been displayed together and outside of England, rare specimens and artifacts from famous voyages such as those of Captain Cook and Charles Darwin. “The Endurance: Shackleton’s Legendary Antarctic Expedition” will follow, with a tale of adventure and near-tragedy in 1914 when Sir Ernest Shackleton and his crew survived the sinking of their ship under the harshest of Antarctic conditions.

In addition to these legendary exhibits, over the next few issues we’ll look at the museum’s artifacts of exploration and at how the museum is involved in contemporary discoveries through its works. We’ll also feature museum projects that are inspiring the curiosity that creates future explorers.

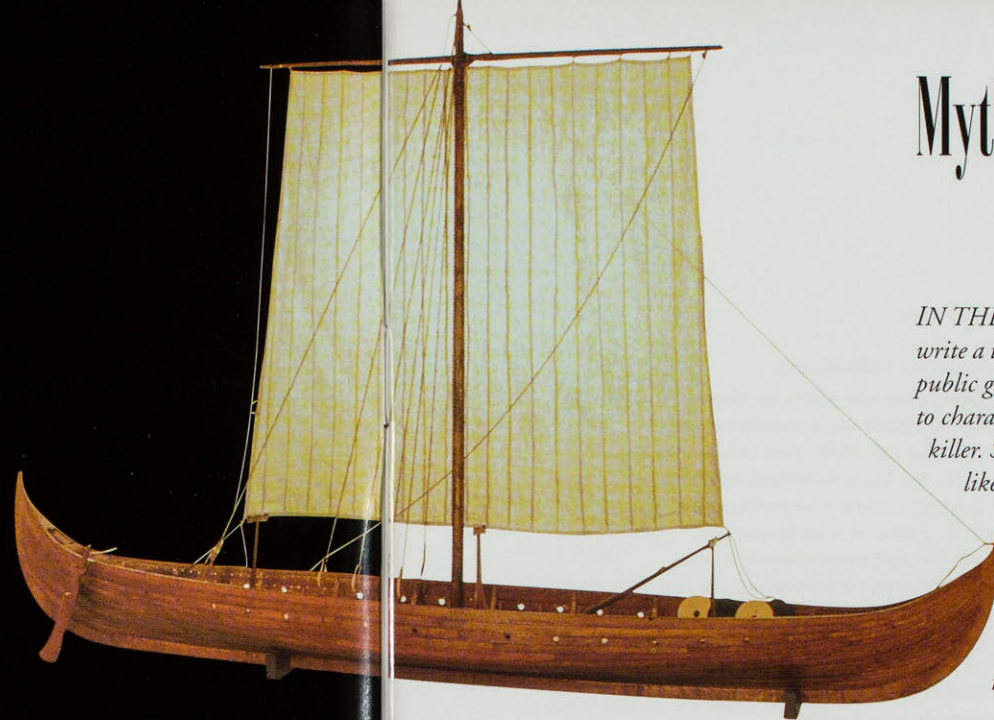
Join us on these voyages back in time, in order to illuminate the present and stir our imaginations to wonder at what lies ahead.

FRONT COVER:
Islandingur, a modern replica of a Viking ship.
Photograph by Antonio Otto Rabasca, courtesy of skipper Gunnar Eggertsson of the Vestmann Islands, Iceland.



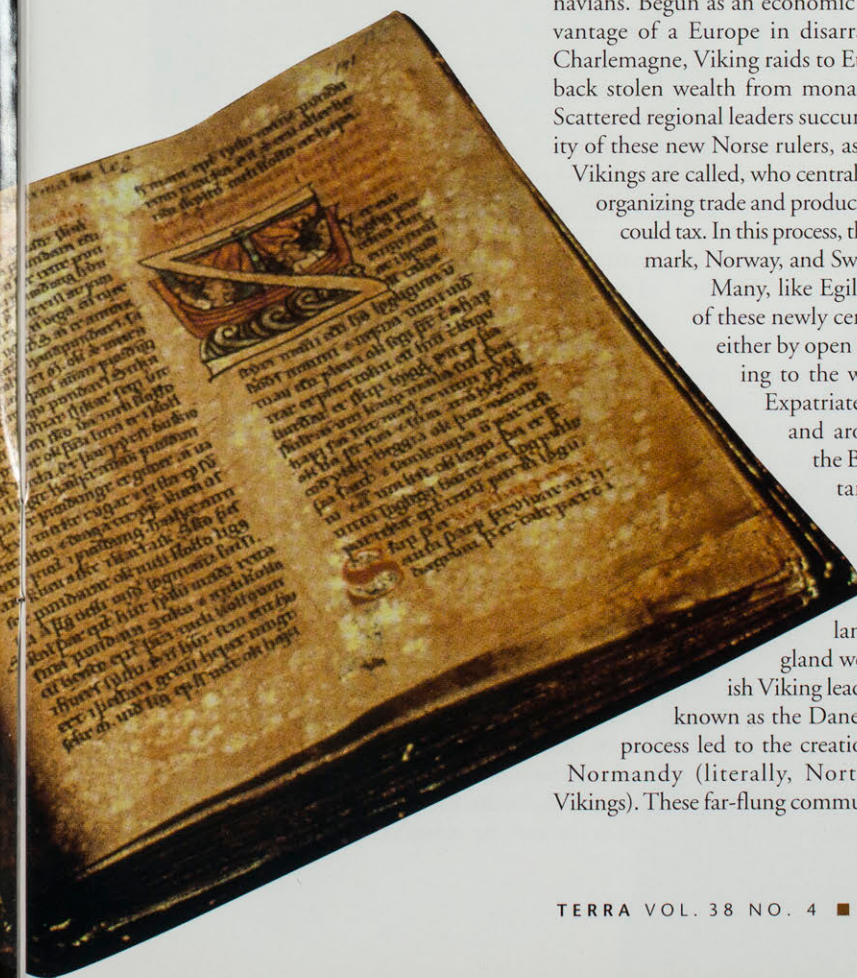
Jonsbok (Book of Laws)

Pages from one of Iceland’s beautifully illuminated manuscripts, circa 1350. Arni Magnusson Institute, Reykjavik. Photo by Johanna Olafsdottir.



Viking Ship Model

This scale model recreates the features of the vessel found in the Gokstad ship burial in Oslo Fjord. It is shown rigged and set with sail but without the oars or shields that would have been mounted when ready for battle. There would have been no Viking Age without the Viking ship. Museum of National Antiquities, Stockholm. Photo by Christer Ahlin



Mythic Explorers and Warrior Poets

IN THE YEAR 1225, Snorri Sturluson sat in the dimly lit room of his sod-covered house and began to write a tale of a famous Viking warrior, Egil Skallagrimsson. The tale had been recited for generations at public gatherings, as was the Norse custom before the advent of writing. Snorri struggled with how best to characterize a man lauded by many of his countrymen as a hero, but vilified by others as a merciless killer. Snorri wanted his story to please the majority, but was uncertain how history would judge a man like Egil. Iceland had been converted to Christianity for over 200 years, and church fathers had tried to replace violent stories of Viking warriors with stories of gentle saints, but many of the old traditions, like intricate skaldic poetry, were worth preserving. The warrior Egil had also been a remarkable poet, and what better follow-up volume to Snorri’s treatise on poetry than a lively retelling of Egil’s saga. On balance, Snorri’s love of poetry outweighed his allegiance to the church, and so he penned a remarkable portrait of Egil, the warrior poet. In keeping with tradition, Snorri decided not to sign his name to the work: the tale belonged to all of Iceland.

THE SAGA OF EGIL is one of four original Icelandic manuscripts on display in the exhibition *Vikings: The North Atlantic Saga*, which opens at the Natural History Museum on November 17th. Though written in Iceland in the medieval period, this saga captures much of the essence of the Viking experience, which is detailed in this historic exhibit, the first time that artifacts from all the regions visited during the Viking western expansion have been shown together. It is a rare opportunity to revisit Viking history and influence.

The period from A.D. 750 to 1050, known as the Viking Age, was a time of transition for Scandinavians. Begun as an economic venture to take advantage of a Europe in disarray after the fall of Charlemagne, Viking raids to Europe soon brought back stolen wealth from monasteries and villages. Scattered regional leaders succumbed to the authority of these new Norse rulers, as the descendants of Vikings are called, who centralized power, often by organizing trade and production sites which they could tax. In this process, the kingdoms of Denmark, Norway, and Sweden were born.

Many, like Egil, resisted the power of these newly centralized kingdoms, either by open hostility or by moving to the west, east, or south. Expatriate Vikings settled in and around Lake Ladoga, the Baltic Sea, Kiev, Brittany, northern Scotland, the Isle of Man, Dublin, and the Orkney and Shetland Islands. Portions of England were granted to Danish Viking leaders, creating an area known as the Danelaw, while a similar process led to the creation of the Duchy of Normandy (literally, Northern Men, a.k.a. Vikings). These far-flung communities formed a net-

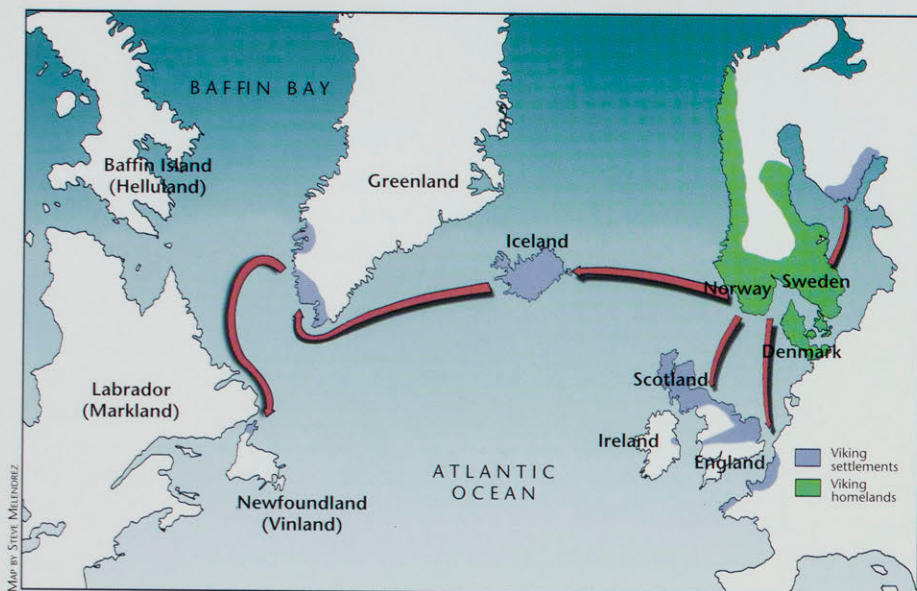


The Lewis Chessmen

In 1831 a spectacular cache of 93 chessmen carved from walrus ivory, most likely from Greenland, was discovered on the Isle of Lewis, Scotland, which was connected to a Viking trade network that embraced all of the North Atlantic. The warrior on the right is biting his shield in anticipation of battle. Photo courtesy of National Museum of Scotland.

work of connections reaching to all corners of the known European world. Egil’s travels brought him to many parts of this extended theatre, from Iceland to England, Norway and the Baltic coast.

In these diverse areas, Vikings were constantly encountering new cultures, and in many cases assimilating foreign practices. By far the most dramatic change in Scandinavian history was to occur through this exposure: the conversion to Christianity. Continental kings would offer land to appease Viking raiders, as in the case of Normandy and the Danelaw. These kings, however, were forbidden by the church from signing treaties with pagans, so Viking chieftains would often agree to baptism as a precondition of payment. Some seem to have been genuine in their faith—certainly the soaring cathedrals and finery of the Catholic church would



Vikings in the North Atlantic

The Viking expansion across the North Atlantic took place approximately between A.D. 800 and A.D. 1000, when Leif Eriksson, son of Erik the Red of Greenland, arrived in North America. Norse voyages required hundreds of miles of open sea passage, through seas that were treacherous with pack ice, icebergs, contrary winds, and fog. Viking exploration is directly linked to the Viking longship, the Internet of its time, connecting distant people, conveying information, creating commerce, and changing the known world.

Picture stone

Vikings on the island of Gotland erected engraved limestone slabs known as picture stones. This stone illustrates a common motif, a ship sailing deceased warriors into the afterlife and two Viking warriors battling in Valhalla, the warriors' heaven. Museum of National Antiquities, Stockholm. Photo by Christer Ahlin



have been convincing evidence of supernatural power. Egil Skallagrimsson was not one of these converts, and, in fact, he and his father came to Iceland to be able to freely practice their pagan beliefs.

The story of Egil embodies many of the themes explored through beautiful objects and gripping visuals displayed in this exhibit. Swords and looted items combine with artifacts of religious conversion and tools of daily life to present a rounded view of life in Scandinavia and Viking settlements abroad.

Several model ships demonstrate the remarkable craftsmanship of these "sea-steeds" as they were poetically termed by Egil and others.

Two other sagas capture the spirit of exploration near the end of the Viking Age. *The Saga of Erik the Red* and *The Saga of the Greenlanders* tell a unique and historically important story of Viking voyages to North America 1,000 years ago. Details vary between the accounts, written at different times and in different parts of Iceland, but the general outline tells of Vikings who left Iceland and settled in Greenland, led by the enigmatic Erik the Red. From there, lands were spotted farther to the west, which Leif the Lucky, Erik's son, named Helluland (flat slab land, probably Baffin Island); Markland (forest land, probably Labrador); and Vinland (wineland, probably the area around the Gulf of Saint Lawrence). The sagas tell of expeditions to explore these areas, and of various settlements made in Vinland, which was said to be a boun-

tiful land, rich in resources. But these lands were also dangerous. Native inhabitants, called *skraelings* by the Norse, were sometimes trading partners and sometimes enemies. The sagas offer tantalizing clues to the historic puzzle of whether the Vikings were in North America 500 years before Columbus. If so, where did they settle? How long did they stay?

The exhibition highlights these stories in a "saga theatre," a recreated portion of a Viking-style longhouse, where visitors can listen to Thorfinn, a storyteller. More importantly, the exhibition shows the archaeological evidence of a settlement in northern Newfoundland, Canada, which confirms that the Vikings were indeed in North America 1,000 years ago. Though their stay seems to have been short-lived, knowledge of the North American continent was not lost to the Norse in Greenland, who continued to make periodic excursions, especially to northern Canada. Evidence for this is found in scattered native American (Thule and Dorset) sites of the Canadian arctic, which contain Norse material mixed in with native artifacts. It is likely that there was sporadic contact between the Norse and Native Americans from the year 1000 until at least A.D. 1300.

The final chapter of the Viking tale in the North Atlantic, which was the end of Norse settlements in Greenland, was never recorded in any written saga. The exhibition tells this story through archaeological evidence, which provides haunting clues to the slow death of the settlements by about 1450, after flourishing from A.D. 1000 to 1300. Fragments from a copper bell, numerous crucifixes, and stain glass window pieces found at one of the three large stone churches in Greenland testify to the strength of Christianity there after the conversion of 1015. But by the 1300s, a cooling climate and resource-depleting farming methods had stripped the land, until the inhabitants had trouble surviving from one year to the next. An infant's coffin and a small girl's

burial dress tell the tale of a high rate of infant mortality better than any saga.

With the abandonment of Norse farms in Greenland, Viking expansion across the North Atlantic came to an end, but the legacy of the Vikings in popular culture continued. Since the 19th century, Vikings have been closely associated with horned helmets, thanks in large part to costume designers of Wagnerian opera. This popular icon, however, is erroneous. No Viking Age helmets have ever been found with horns on them! In the face of this persistent popular image, modern scholars struggle with how to represent the Vikings, much as Snorri did 800 years ago. Were they violent raiders? Were they ingenious boat builders and daring explorers? Were they materialistic, hedonistic pagans? Were they poets? They seem to have been many things at once. One thing is clear—they were complex beyond the mythology and stereotypes that have survived them.

Elisabeth Ward is Assistant Curator of Vikings: The North Atlantic Saga and co-editor of the companion volume. Her Icelandic ancestry spurred an early interest in Scandinavian languages and the sagas, and her current research focuses on the importance of the past in Icelandic nationalism.

Vikings: The North Atlantic Saga will be on exhibit from November 17, 2001 through March 17, 2002. This exhibit has been made possible through the generous support of the Nordic Council of Ministers and Volvo. Additional support provided by Husqvarna Viking Sewing Machines, Barbro Osher Pro Succia Foundation, and Philips Petroleum Company Norway. Local sponsorship provided by AT&T Broadband and Scandinavian Airlines (SAS), the official airline of the Vikings exhibit.

Organized by the National Museum of Natural History, Smithsonian Institution. Presented in partnership with the White House Millennium Council.

VIKING LOOT

Reliquary casket

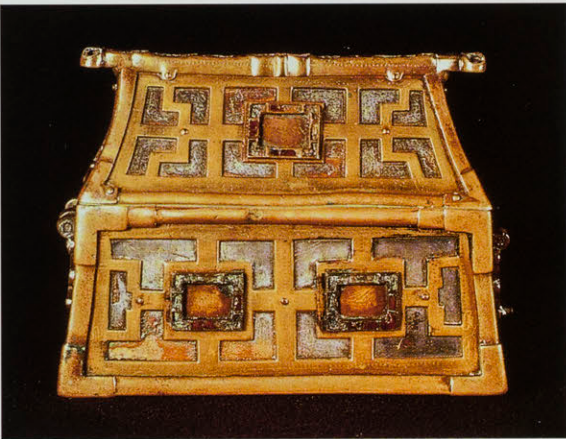
National Museum of Denmark.
Photo by Kit Weiss.

Silver inlaid Viking swords

University Museum of Cultural Heritage,
Oslo. Photo by Peter Harholdt.

Penannular brooch

University of Bergen Museum. Photo by
Peter Harholdt



Voyages of Discovery

IT ALMOST NEVER FAILS—use the phrase “Voyages of Discovery,” and the picture that comes to mind is one of three-masted schooners, Victorian-era expeditions, harsh field conditions, daring captains, and hardy naturalists slaving over handwritten, leather-bound journals. We think of Joseph Banks with Captain James Cook aboard the *Endeavour*, Meriwether Lewis and William Clark traveling up the Missouri River in a keelboat, Aimé Bonpland and Alexander von Humboldt on the *Pizarro*. And, of course, the five-year voyage of Charles Darwin and Captain Robert Fitzroy on the *H.M.S. Beagle* is never far from the top of the list. What marvels they found, what bizarre forms of life they collected, what awesome regions of the globe they visited.

The problem is that all such voyages are thought of in the past tense. True, there was a “golden age” of classical natural history expeditions. But have these voyages of discovery ended? Have most of the world’s species been discovered, described, named? Hardly.

In fact, the more we learn about the natural world around us, the more apparent is our lack of knowledge, and knowledge is needed more today than at any time. We are facing rates of extinction and habitat loss on a scale that was not dreamed of in the past.

But what can we find today to equal the excitement generated in those heady days of the Victorian era? I contend that we are living now in an age of discovery that is as exciting as any time in our past, full of the weird, the wonderful, and the unexpected, and that the curatorial staff at the Natural History Museum is very much involved in this adventure.

Recent and Current Voyages of Discovery

Today our equipment has changed dramatically, but our goals have not. We still strive to reach remote areas, document the fauna and flora of unique regions, and discover and describe spe-

The world as it was known in 1532, attributed to Hans Holbein, only ten years after Magellan’s circumnavigation. From the Shearman Collections in the Seaver Center for Western History Research



Jellyfish

This enormous new species of jellyfish was found in southern California waters and described by Dr. Martin and colleagues in 1997. Of those creatures lacking a backbone (collectively termed "invertebrates," although they are not all closely related), this was the largest species described in the 20th century.

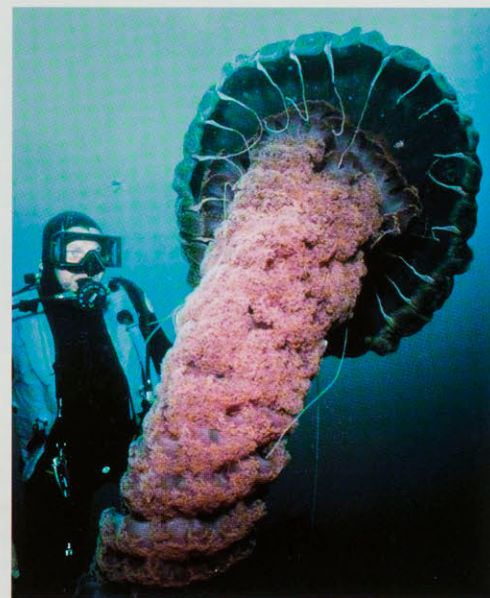
cies unknown to science. The leather-bound journal has largely been replaced by laptop computers (although some of us still keep a handwritten journal, perhaps because there is a tangible joy associated with writing results by hand at the end of a hard day of field work). The expedition illustrator has been replaced with cameras, often digital, although there still is no substitute for an accurate illustration rendered by a skilled artist. We have the ability to take a digital photograph in the field, load the image onto a laptop computer, send the image via satellite to another specialist anywhere in the world, and ask relevant questions about the specimen before we even collect it.

But what are the results of these modern voyages of discovery? It may come as a surprise to learn that today we are describing new species at rates easily equal to those of the expeditions of the 1800s, even though a modern description entails considerably more work and detail. One might expect that the large number of newly discovered organisms is because they are mostly small species that were overlooked, or because powerful new molecular tools allow us to distinguish populations that in the past seemed identical. Both are true in some cases, but in fact, descriptions of new species of some very large animals, including mammals, also are on the rise. In the mountainous region between Laos and Vietnam, a new species of bovid, the family to which cattle belong, was described in 1993. In that same region, there have been three new species of muntjac deer found since 1996. Later this year, a new species of whale will be described, representing the first new species of cetacean described in almost 20 years.

Although we think of mammals as large organisms, there are, of course, larger ones. New species of trees are also being discovered, again at surprising rates and from well known areas. In 1989, a new species of tree named *Ticodendron incognitum* was described from Costa Rica; it is now known from montane rainforests ranging from Mexico to Panama. In 1994, the seed-bearing tree *Wollemia nobilis* was discovered and described from Wollemi National Park, north of Sydney, Australia, a large tree with a very distinctive morphology, resembling fossil trees from the Cretaceous period. Yet it was discovered near Australia's largest city, in a national park, only seven years ago. Also from Australia comes *Eidothea zoexylocarya*, a newly discovered tree reaching over 120 feet in height, whose closest relatives are 60-million-year-old fossils. A second "living fossil," the Nightcap oak, over 120 feet in height and over 30 inches around, was discovered in December 2000 in New South Wales, Australia. In 1998, *Erismia japura* was collected, the dominant tree species in the non-flooded forests of Venezuela, reaching over 100 feet in height. Its unusual winged fruit is used by local people as a source of starch, but the species

had never been recorded from Venezuela despite the fact that this region was rather extensively explored by Alexander von Humboldt, Aimé Bonpland, Richard Spruce, Alfred Wallace, Llewelyn Williams, and other notable explorers. Closer to home is the discovery of *Neviusia cliftoni*, a small shrub from the region around Mount Shasta. It is abundant and conspicuous when flowering, but even with the large number of visitors to this part of northern California, it had never been collected before 1992.

Discoveries of new species of amphibians are also on the rise. In the last 40 years, more new species of amphibians have been described than in all the years from 1750 through 1900 combined. Some are the result of "splitting" former species based on new genetic information, but most are simply the result of venturing into unexplored regions with old fashioned, keen-eyed naturalists collecting specimens using time-honored techniques.



In 1989, I had the pleasure of collecting an unknown and very large species of scyphozoan jellyfish that had washed ashore by the thousands during June and July. Because there are so few marine taxonomists working on jellyfish, it was not until 1997 that we were able to describe it as *Chrysaora achlyos*. A veritable sea monster, it reaches over three feet in diameter across the bell, with 18-to 20-foot tentacles and oral arms, making it the largest invertebrate animal described in the 20th century. Where did I encounter this bizarre beast? Venice Beach, California, hardly a remote or unpopulated region, although some would say it is a rich source of unusual life forms.

Starfish

This small starfish is one of the relatively few species of asteroids found on Guana Island. This specimen was collected by T. Zimmerman and J. Martin while snorkeling in shallow water in the grass beds on the Atlantic side of the island.



TODD L. ZIMMERMAN

There are more examples. In the life sciences, we divide known life forms into phyla, the most basic of the taxonomic units, and there have been several new phyla described in the last two decades as compared to none in the entire 19th century. In 1983, the phylum Loricifera was established for minute animals that are found among sand grains on the ocean floor. In 1995, the phylum Cycliophora was established to accommodate a small creature found on the mouthparts of the Norwegian lobster, *Nephrops norvegicus*. In both cases, the new discoveries resulted from closer examination of things already known.

Modern manned and unmanned deep sea submersibles have made dramatic discoveries of new life forms at hydrothermal vents, but it is not only the large-scale expeditions that increase our knowledge of the world around us. The new jellyfish species mentioned above, found near one of the world's most densely populated regions, is one example. Another is the discovery in 1996 of a new species of

lungless salamander in the San Gabriel Mountains, less than 30 miles from Los Angeles.

The Museum's Modern Explorers

Are Natural History Museum curators involved in these modern voyages of discovery? Absolutely. We are carrying on a time-honored tradition. Listed below are some of the expeditions involving museum curators who are exploring and finding new, undescribed species.

■ **Gordon Hendler**, Curator of Echinoderms, has dived in the manned submersibles *Johnson-Sea-Link*, *Delta*, *Turtle*, and *Sea Cliff*, as deep as 10,000 feet, and used the remotely operated vehicles *ROPOS* and *ATV* to study the invertebrates that thrive in Caribbean and Pacific deep waters.

■ **Brian Brown**, Associate Curator of Entomology, along with Mike Sharkey, from the University of Kentucky, and others are conducting an in-depth survey of the insects of Colombia, a country so rich in species that it has been termed "mega-diverse."

TOP LEFT

Hermit crab

Hermit crabs are among the most challenging crustaceans to identify. This spectacular species, another example of the marine diversity surrounding Guana Island, is shown removed from the borrowed gastropod shell in which it lives.

TOP RIGHT

Marine worm

One of a huge number of unusual species of marine worms, the subject of study of curator Kirk Fitzhugh and collections manager Leslie Harris. This specimen was collected by museum staff in shallow waters off Guana Island.

RIGHT

White shrimp

This undescribed species of lobster-like shrimp was found off Guana Island in the Caribbean by the Zimmerman and Martin team. They estimate that 30% of everything they are finding there is new to science. This specimen, one of only two that exist, was collected from an artificial coral reef assembly invented by the team for attracting coral reef species.

FAR RIGHT

Treefrog

A new species of treefrog of the *Hyla larinopygion* group was recently discovered in a cloud forest in southern Ecuador by Dr. David Kizirian, Curator of Herpetology. This species possesses a unique repertoire of anti-predator mechanisms, including a sticky, noxious skin secretion and a posture that prominently displays otherwise concealed white patches.



TODD L. ZIMMERMAN



LESLIE HARRIS



TODD L. ZIMMERMAN



DAVID KIZIRIAN

■ Todd L. Zimmerman, a graduate-student-in-residence and a Research Assistant in Crustacea, and I are leading a team of six to eight marine biologists (including three museum staff members) to the coral reefs of Guana Island in the British Virgin Islands each summer to document small, cryptic invertebrates. Thirty percent of what we're finding is new to science.

■ Christine Thacker, Assistant Curator of Fishes, is heading a multi-year project to study the evolution and distribution of several goby species (a small, bottom-dwelling reef fish) throughout the Society Islands and other archipelagos in the South Pacific.

■ David Kizirian, Assistant Curator of Herpetology, is conducting a general survey at remote localities in poorly known regions of Ecuador, with colleagues at the Pontificia Universidad Católica del Ecuador.

■ Luis Chiappe, Associate Curator of Vertebrate Paleontology, is continuing to discover extinct species as he breaks new ground (literally and figuratively) in his fascinating search for dinosaur embryos in Patagonia as well as expanding his search for Early Cretaceous vertebrates in the northwestern corner of China. He is also part of a team that is resuming exploration of the vast dinosaur deposits west of the Rocky Mountains.

Tomorrow's Voyages of Discovery

Discoveries we are making today compare favorably with some of the most famous exploits in the annals of natural history. In fact, the museum as a whole is embarking on an unprecedented "Voyage of Discovery" as we enter a new millennium and create a new museum, both metaphorically and physically, with unlimited opportunities for advancing knowledge of the natural world. What we find will depend on our determination, vision, attitude, and perseverance.

Dr. Joel W. Martin, the museum's curator of Crustacea and Chief of the Division of Invertebrate Studies, is a leading authority on biodiversity, particularly as it pertains to marine invertebrates. With funding from the National Science Foundation, he organized the first conference of government-sponsored biodiversity scholars in 2000, and he is currently funded by the National Science Foundation to survey the marine biodiversity of Guana Island in the Caribbean.

Building Trees to Understand Biological Diversity

Cladograms as a Tool

As new species are discovered and more of the fossil record is revealed, how do we make sense of how organisms are related? How do we know when a discovery is truly of something new? Among the many tools available to describe the answers to such questions are cladograms.

IN THE 19TH CENTURY, Charles Darwin theorized that life on Earth has changed over time by way of natural selection, providing the most unifying principle in all of biology. Darwin wanted to explain the vast uniformity and differences of structures observed among different organisms. This trait, to attempt to understand what we observe around us, is a fundamental and insatiable desire shared throughout history by humans, as well as the goal of all the sciences.

How does this goal manifest itself in research that goes on in natural history museums? In the field of evolutionary biology, one common approach is a method known as cladistics. Literally translated, cladistics means "the study of branching." More accurately, cladistics is a method to hypothesize the relationships among organisms using evolutionary trees known as cladograms, something akin to a family tree or genealogy. Take, for example, the three individuals shown in Figure 1, a fish, a dog, and a human. Intuitively, you and the evolutionary biologist would say that dogs and humans are "more closely related" to each other than either is to the fish; so, the dog and human are shown more closely joined together.

We readily speak of objects as having some degree of relatedness, but what exactly does this mean? To say that two things are related to one another indicates that there is a specific conceptual relationship between them. For instance, we might conclude from Figure 1 that humans and dogs are more closely related to one another because they both have hair, whereas fish have scales. Similarly, the fish, dog, and human each have a backbone, in contrast to an animal such as a worm. The conceptual relation in these cases would be one of similarity, with objects segregated into logical classes based on features they have in common, such as "things with hair," or "things with backbones." It has not been uncommon for biologists to develop classifications only based on similarities, so that, for example, dogs, humans, and other organisms with hair are said to be members of the group Mammalia, and dogs, humans, fishes, and other organisms with backbones are members of the Vertebrata.

But classifications only based on features held in common cannot satisfy the goal of scientific investigation—while the task of describing what exists in the world is an immensely important part of science, the overall goal of science is to understand what we have described. As a rule, when evolutionary biologists speak of dogs and humans as being "more closely related" to each other than to fishes, the concept of relatedness is actually an answer to such questions as, "Why do dogs and humans have hair?" In other words, the cladogram is actually an evolutionary hypothesis in diagrammatic form that suggests answers to questions about similarity, and classifications of organisms derived from cladograms summarize those hypotheses. Thus, to the question of why dogs and humans have hair, the cladogram's branches offer an answer: "Dogs and humans both have hair because at some time in the past there existed an ancestral species with hair which split into descendant species that eventually led to dogs and humans."

Looking again at Figure 1, we can now interpret the branches of the cladogram quite clearly. Each branch directly leading to the fish, dog, and human represents each of these individual species. For all of them, the hypothesis states that these species, as well as all other vertebrates, were derived from a common ancestral species that had a backbone. Later in time, hair originated in another ancestral species from which dogs, humans, and other mammals were subsequently derived. One can also see how our classifying these individuals in the Vertebrata and Mammalia also conveys these explanations, not just the shared features we observe. So through the use of cladograms, and the relatedness of features they propose, a deeper, scientific understanding of the evolutionary origins of all life is more available.

Cladistics is a vital part of evolutionary research because it provides a logical means to put forth answers to many questions and to summarize our understanding of what exists in the present by better understanding what happened in the past.

Dr. Kirk Fitzhugh is Associate Curator of Polychaete Worms in the museum's Invertebrate Zoology section. In addition to his research on the evolution and taxonomy of polychaetes, Dr. Fitzhugh has a strong fascination with the link between science and philosophy, especially in the area of evolutionary biology.

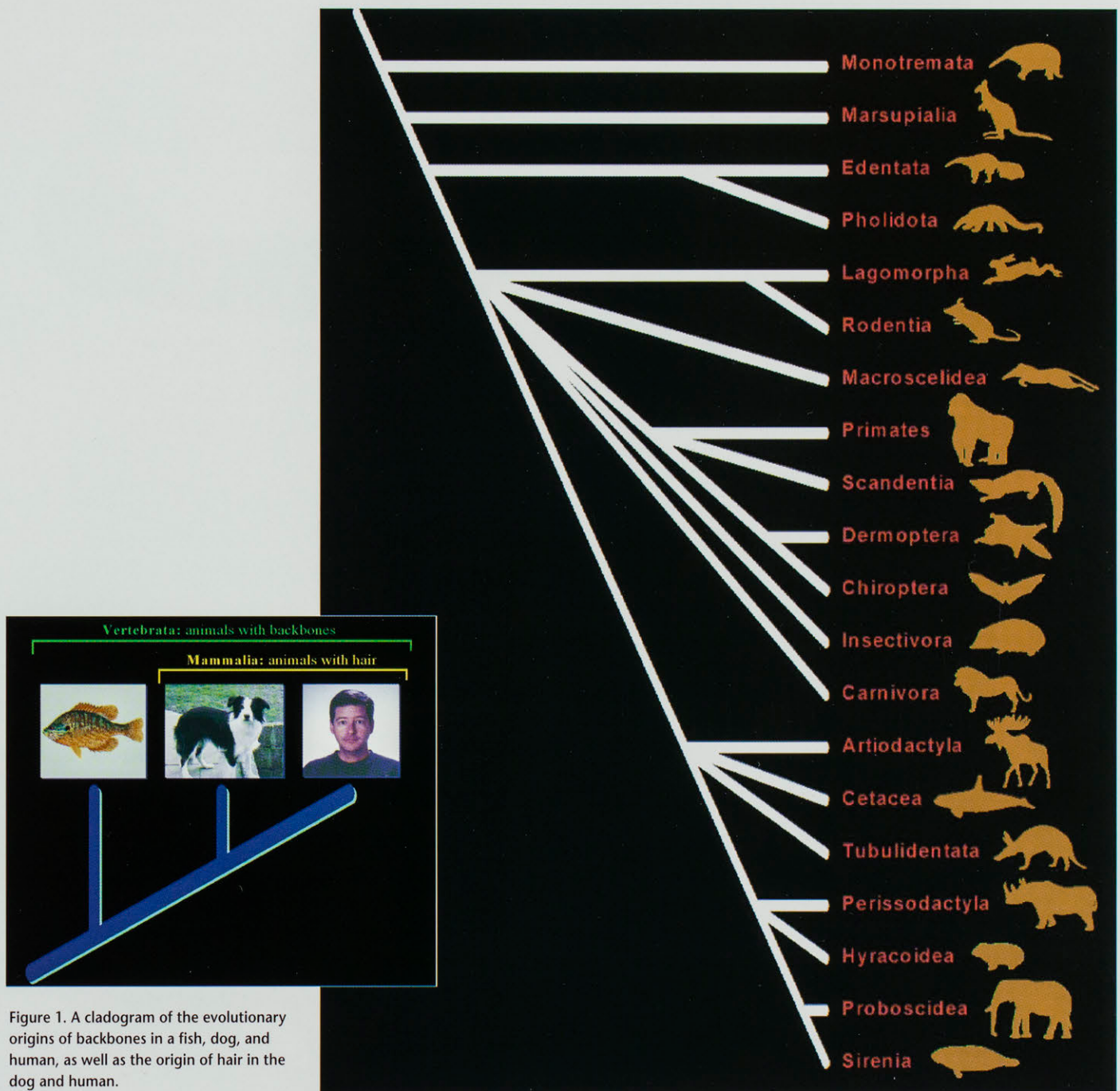


Figure 1. A cladogram of the evolutionary origins of backbones in a fish, dog, and human, as well as the origin of hair in the dog and human.

Cladograms are hypotheses of past evolutionary events that explain our observations of shared similarities among various groups of organisms. In some cases, cladograms can be quite complex, since the diversity of organisms involved can be immense. But cladograms also offer evolutionary biologists great insight about what we do not yet know. Shown here is an actual cladogram of evolutionary relationships among the major groups of mammals based on the multitude of data from skeletal and soft tissue anatomy, and DNA. Even with this vast amount

of current knowledge, our understanding of relationships among very familiar groups is still tenuous. For instance, in this cladogram there is uncertainty as to the closest relatives to such notable groups as insectivores and carnivores. Similar disputes also surround the question of which group is most closely related to cetaceans, the whales and dolphins. Uncertainty is actually an added benefit of cladograms—while they are hypotheses reflecting our current knowledge, they also indicate directions for future research.



The Essence of Adventure

The Amelia Earhart Collection in the
Seaver Center for Western History Research

THE ESSENCE of adventure is risk....It is the great temptation because of the awful odds. To those who love life, the temptation is greater, of course. [To] play with the thing most highly valued is adventure." Pioneering aviator Amelia Earhart wrote these words in her bold and flowing hand soon after her tri-motor Fokker seaplane touched down off the coast of Wales, June 18, 1928. Her transatlantic crossing, completed only one year after Charles Lindbergh's solo flight, was the first ever for a woman. Her hand-written log of that flight, part of the Amelia Earhart Collection in the Seaver Center for Western History Research in the Natural History Museum, reflects the joy she found in aviation and the taste for adventure that drove her exploits.

Earhart understood the risks she took. On her Atlantic crossing, she and pilot Bill Stultz fought strong headwinds, dense fog and a malfunctioning radio. They had hoped to make landfall over Ireland's Dingle Peninsula, but their calculations put them well past that point, with still no sight of landfall. To gain some visibility, Stultz brought the plane down steeply, emerging from the clouds at 500 feet. They spied a ship and circled several times. Hoping to get the captain to signal their position, they tied notes to oranges and tried twice to toss them onto the deck of the ship, but failed on both attempts.

With barely enough fuel to complete the flight under the best conditions, the engines began to sputter every time Stultz dipped the nose. Then, out of the mist loomed the coast of Wales. "Coming down now in a rather clear spot," Earhart wrote, her excitement evident in her hasty scrawl. "Everything sliding forward...ten boats!!!" Safely in the harbor at Southampton, England, Earhart was mobbed by reporters and adoring crowds.

Many called her exploits foolhardy. Earhart herself found the element of danger irresistible, but she firmly believed that her flights were never reckless. In 1935, as she prepared to take off on the first solo crossing from Hawaii to California by any pilot, male or female, she sent a note to her husband, the publisher George Palmer Putnam. "I am quite aware of the hazards of

the trip," she wrote, but she knew that her equipment was up to the task and so was she. As to why she would venture such risk, she answered as she always had: "I want to do it because I want to do it. Women must try to do things as men have tried. When they fail, their failure must be but a challenge to others."

That flight, yet another dazzling success, was followed two years later by her most daring adventure, a circumnavigation of the globe. Many believed she was pushing too hard. "She was caught up in the hero racket," complained her friend Hilton Railey. Earhart had heard the criticisms, but shrugged them off. She found the challenge exhilarating and that was analysis enough for her.

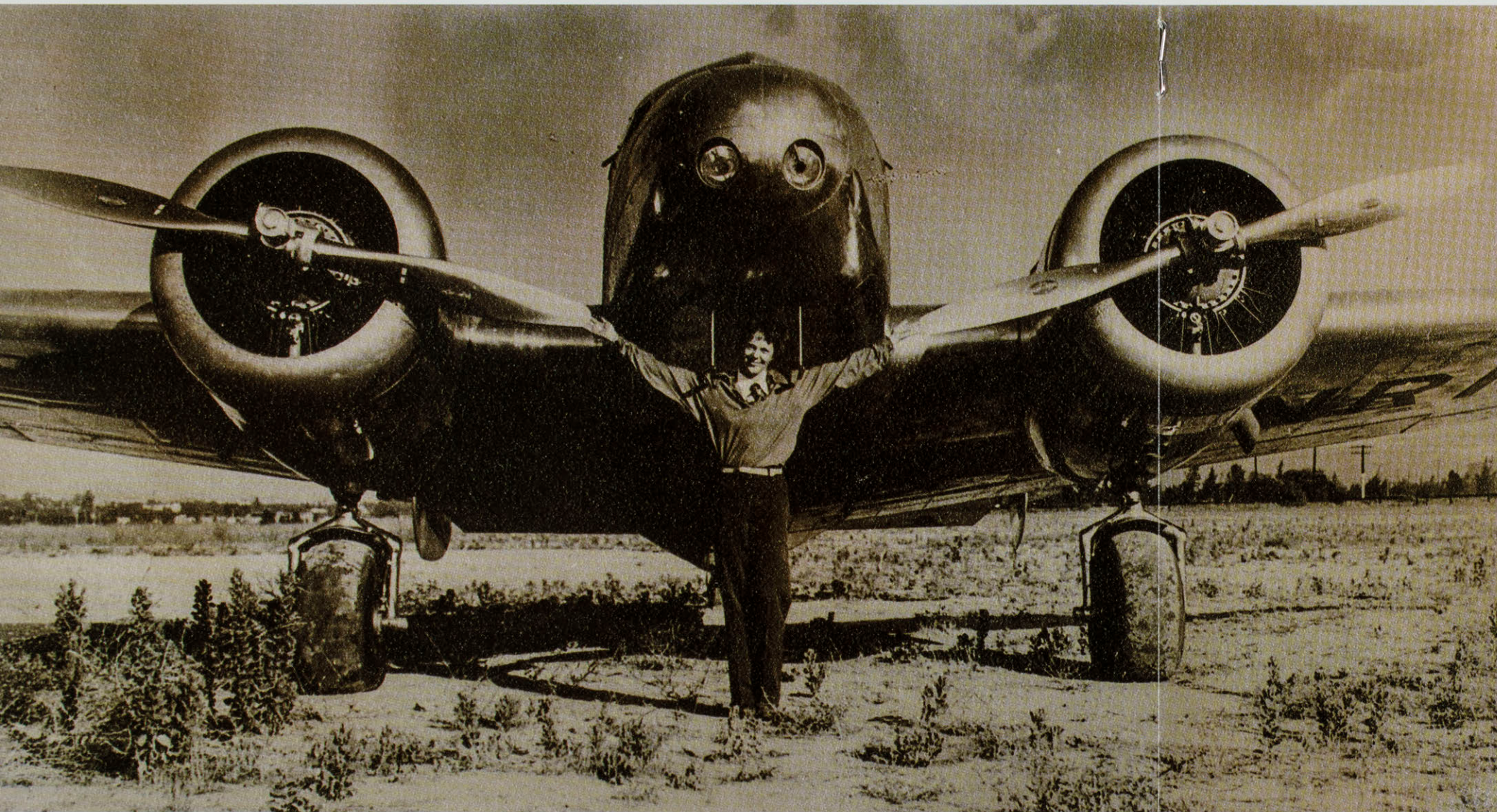
The final and most difficult leg would be the Pacific crossing. No matter what route she took, she would have to stop to refuel before reaching Hawaii. With navigator Fred Noonan, she planned to fly east from New Guinea for Howland Island, a tiny speck some 2,500 miles across open water. Noonan would navigate by the stars; Earhart would try to establish radio contact every half-hour with

Amelia Earhart climbs out of her >
Lockheed Vega near Londonderry,
Northern Ireland, on May 21, 1932.

While known as a woman of
glamour and adventure, after
fifteen hours of solo flight across
the Atlantic, what she wanted
most was a shower and a long rest.



< Still wearing her aviator's cap, Earhart
is surrounded by an admiring crowd in
Southampton, England, after
completing her transatlantic flight on
June 18, 1928. Her plane, the
Friendship, rests in the harbor.



Amelia poses with her new Lockheed Electra before her last flight in 1937.



Amelia with her husband, George Palmer Putnam, publisher and architect of her public persona, shortly after their wedding in February 1931.

the coast guard vessel *Itasca* stationed off the coast of Howland Island. They encountered steady headwinds throughout the flight, drawing out the expected passage from around fifteen hours to nearly twenty. The frequent cloud cover made celestial navigation difficult. As the plane drew closer, the crew of the *Itasca* received a faint message: "About 200 miles out." Half an hour later they heard from Earhart again, "Please take bearing on us and report in half hour." Earhart's radio was not receiving the coast guard signals, however. Her next message, over an hour later, sounded a worried note: "We must be on you but cannot see you but gas is running low." Thirty minutes later *Itasca* heard "We are circling but cannot see island cannot hear you...." Twenty hours and fourteen minutes into the flight Earhart radioed her final message: "We are on the line of

This glowing portrait of Amelia was made soon after the completion of the first transatlantic flight in 1928.

All photographs are from the Amelia Earhart Collection in the Seaver Center for Western History Research, Natural History Museum of Los Angeles County.



position 157 dash 337 will repeat this message on 6210 kilocycles. We are now running north and south." The crew on board *Itasca* waited in increasing desperation. An hour and a half after Earhart's last transmission, they radioed fleet headquarters. "Search results depend upon continued good weather and ability plane or emergency boat remain afloat....*Itasca* using every resource to locate plane."

By 7 p.m. that evening a tropical storm had moved in, bringing ten-foot swells and choppy seas. In the coming weeks, repeated air and sea searches found not a trace of the fliers or their plane. The fate Earhart had tempted so often had claimed her. As she predicted, her exploits and the spirit of adventure that drove them continue to inspire women and men to this day.

The flight log, letters, and radio transmissions quoted here are part of the Amelia Earhart Collection in the Seaver Center, along with roughly four hundred other letters, photographs, and ephemera. They are among the most intriguing and widely consulted materials in the collections. In keeping with the museum's goal of sharing its collections with the public and with other institutions, the log and two of Earhart's letters will be featured in the exhibit, The World from Here: Treasures of the Great Libraries of Los Angeles, opening at the UCLA-Hammer Museum October 17, 2001.

Dr. Jonathan Spaulding is Associate Curator of the Seaver Center for Western History Research.

Andrew Forbes and the High Sierra

Explorer with a Camera



All photographs by Andrew Forbes from the Andrew Forbes Collection, Seaver Center for Western History Research.

AT THE DAWN of the twentieth century, the rugged peaks of California's Sierra Nevada remained a realm of mystery—wind-swept, storm-wracked and largely untraveled. Native Paiute and Shoshone traders from the Owens Valley had traveled over its highest passes for thousands of years, but they seldom ventured into the surrounding alpine crags and snow-fed lakes. European-Americans, who arrived in the nineteenth century, drove their sheep into the high country meadows during the warm summer months. When the immigrant Scotsman John Muir arrived in California in the 1870s, he found work herding the “hoofed locusts,” but on seeing firsthand the destruction they caused, began a national movement to preserve these and other mountain environments. Writing for a national audience in the 1890s, Muir helped to popularize the high Sierra as a destination for strenuous adventure and communion with nature. Another

wiry and energetic Scotsman, Owens Valley photographer Andrew Forbes, was among the first to explore the high country with a camera. His camera, like Muir's pen, brought adventurers and nature-lovers in its wake.

Andrew Forbes's arrival in the northern Owens Valley town of Bishop around 1900 coincided with a rising nostalgia for wilderness and frontier life. Forbes had traveled through the West in the 1880s and '90s as an itinerant photographer, supplementing his income with work as a cattle hand. He was there at the opening of Oklahoma's Cherokee Strip. He was there in the rough and ready cattle towns of Dodge City and Abilene when cowboys took their pleasures after months on the trail. But the era of the open range was nearly over and the cheap lands of the West nearly all carved up. By 1898, when Forbes decided to join his brother in California, America's frontier era was at an end. Forbes settled



The high Sierra near Green Lake, circa 1910. Note the photographer's signature shadow in the lower right.

down in the Owens Valley, married and started a family. He photographed the society and economy of the valley, its pastures and farms, its towns and festivals. But his favorite subject was the wild and lonely peaks of the Sierra. With his dog and a couple of mules loaded down with camping gear and a bulky panoramic camera, Forbes set out to explore and photograph, often for weeks at a time. He left no written record of his adventures, but his photographs tell the story of what he found.

Dr. Jonathan Spaulding is Associate Curator of the Seaver Center for Western History Research.

Andrew Forbes, with his camera gear and companion, hiking through the late spring snow pack. Mount Whitney is in the far distance.





Gold and silver mines, like the Casa Diablo, brought the first rush of development to the Owens Valley in the 1870s. The mines were still a key part of the regional economy in the first decades of the twentieth century.

Leaving Bishop with enough supplies for an extended adventure.



Forbes's photographs of the Owens Valley Paiute reflect the dignity and resilience with which they met the forces of change.

Our Verdant Valley: The Owens Valley Photographs of Andrew Forbes
October 13, 2001 through April 14, 2002
Dart Gallery

As a companion exhibit to Of Myth and Memory, photographs from the Andrew A. Forbes collection document the people, industry, and landscape of the Owens Valley. Produced by the Natural History Museum from the Seaver Center for Western History Research's collection. These exhibits are supported in part by the Firman Fund and the S. Livingston Mather Charitable Trust. The Natural History Museum of Los Angeles County gratefully acknowledges the Los Angeles Department of Water and Power as a major local sponsor of these exhibits.

Earth Odyssey: Tomorrow's Explorers

Honda's experience has been very positive. Earth Odyssey's innovative environmental science program not only generates interest and skills in science for Los Angeles students, but also shows these students that science can be fun."

JEFFREY SMITH, Senior Manager of Corporate Affairs and Communications,
American Honda Motor Company, Inc.

ON A SUNNY MAY MORNING, a colorful minivan, its exterior covered with wildlife scenes, pulls into Griffith Park. Moments later school buses arrive and children surround the Honda Odyssey® van. "Are we going to see bugs today?" they shout. Sweep nets and binoculars are passed out and soon the area is crawling with curious 4th and 5th graders searching for birds and insects, and enthusiastically investigating a diversity of life previously unknown in their daily world.

A field trip? Definitely, but this is no ordinary butterfly or spider-collecting expedition. These young "junior scientists" are active participants in *Earth Odyssey*, an innovative environmental science outreach program offered through the Natural History Museum of Los Angeles County, and made possible by American Honda Motor Company, Inc.

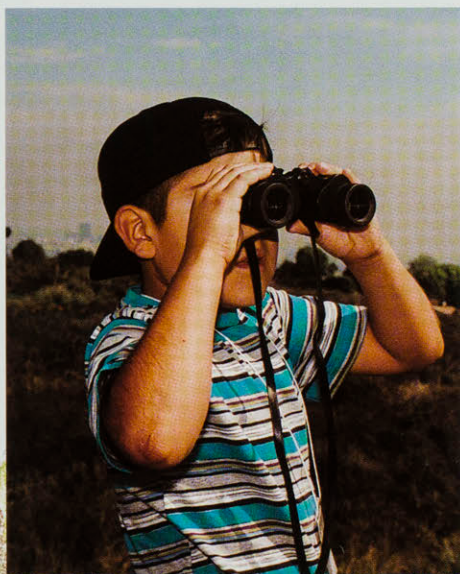
Unlike other science education programs offered in the United States, *Earth Odyssey* is one of the few that takes kids outdoors for bona fide fieldwork. All of the activities, including observing, collecting data, and measuring diversity by counting the number of species in a specific area, are adapted from real-life techniques employed by ecologists and field biologists. In fact, the students are continuing to collect data

in the Baldwin Hills, the site of a biota survey conducted by the Natural History Museum. Their data on birds and invertebrates is shared with the researchers.

Sarah S. Thompson, Outreach Programs Manager for the Natural History Museum, developed *Earth Odyssey* with the primary goal of providing both students and teachers with a unique hands-on experience. "I was very interested in having the kids understand what fieldwork is and why we do it," she explains. "Getting students outside and actually collecting the information themselves gives them a much better understanding of what it is we do at the museum as well as the work that scientists do. It's not just teaching them facts; it is helping to generate interest in science by studying living things and the impact humans have on the environment."

The program, targeted to 4th and 5th graders in urban schools in the greater Los Angeles area, teaches students to become masters of their own learning by sharpening observation skills and learning how to identify and collect data on birds, insects, plants, and other animals. They later compile their data into charts, write reports on their observations, and present the information in class projects. Observing, drawing, and





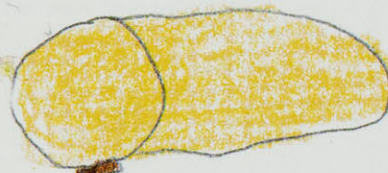
CRISTINA PIZZANI

analyzing their findings strengthen math, reading, and writing abilities that help the students throughout their schoolwork.

American Honda embraced the opportunity to introduce inner-city youth to the world of science and the environment. The company's philanthropic focus has long been directed to contributing in the individual communities in which it does business—both economically and socially. "The Natural History Museum has an outstanding reputation throughout southern California, and Honda's commitment to youth, science education, and the environment made the *Earth Odyssey* program a perfect fit for both organizations," states Jeffrey Smith, senior manager of Corporate Affairs and Communications. "Honda's goals were threefold," he explains. "First, we wanted to engage Los Angeles-area students in environment awareness, and do so with a 'hands-on' perspective. Second, the *Earth Odyssey* program's focus on teacher training would hopefully play a role in improving students' science scores. Finally, the program gives Honda associates an opportunity to volunteer and increase their involvement in the community."

In addition to funding the program, Honda donated specially designed Honda Odyssey® minivans to serve as field vehicles for the project. The vans are equipped with field equipment such as insect sweep nets, binoculars, collecting vials, and a variety of field guides necessary to identify the animals observed during the field investigations.

The *Earth Odyssey* program takes place over a month's period of time and includes a mandatory teacher orientation, two classroom visits and an outdoor field trip. It appeals to many elementary school teachers as an enrichment of their skills in teaching science, and in how to present scientific inquiry. A multivisit format provides invaluable and in depth science training currently not available to teachers anywhere else in Los Angeles.



Honda's 31 volunteers are instrumental in helping students complete their tasks. Volunteer Carol Birondo observes, "Giving students a field trip where they participate in hands-on learning is more effective than just reading the same material in a book." Steve Gulnac, also from Honda, agrees, "The kids were genuinely excited to be there and were very intent on studying their surroundings."

■ Teacher orientation takes place before the first school visit. Museum educators meet with participating teachers to conduct the same types of investigations the students will be undertaking to gain a better understanding of scientific processes and desired results. Teachers are provided with comprehensive materials, including a Teacher's Guide that suggests ways to easily incorporate *Earth Odyssey* lesson plans into their current science, math, and English instruction.

■ Museum educators visit the school. Students are eager to learn how to use the insect sweep nets and canvas beating sheets to collect the tiny insects that cling to plants. Each student receives a field notebook for illustrating specimens, recording observations, and comparing habitats.

Now the schoolyard becomes an environment to explore and a place to learn basic scientific principles of observation, data collection, and site surveying. Drawing "scientific illustrations" helps the young students learn to slow down and observe the diversity around them—they are often amazed to discover the local birds, insects, and plants that share their playground. Sarah Thompson points out that while some schoolyards have beautifully manicured gardens that harbor a diversity of invertebrates, others are a wasteland of blacktop. "The trick is to find the teaching moment in any experience," she says.



■ Field investigation begins. Participating classes travel by bus to one of two designated outdoor preserves, Griffith Park or Kenneth Hahn Recreation Area in the Baldwin Hills. Students conduct the same type of environmental investigation and census studies that museum scientists perform in the field. Using *Earth Odyssey* equipment, small groups of students are assigned specific tasks of surveying wildlife in the habitat. The newly trained "junior scientists" set about collecting invertebrates, noting exactly where they found them, whether lurking under a rock or spinning a web on a bush. "Every field trip is different," notes Sarah. "One week we'll see scrub jays, the next week, we won't." The field experience presents an opportunity for museum educators to encourage deeper thinking through open-ended questions such as, "Why are acorn woodpeckers at Griffith Park and not at your schoolyard?" and "How are mourning doves able to live in the city?"

■ The wrap-up takes place back in the classroom the following week. Museum educators return to review and discuss findings from the fieldwork and data collections. Together, teachers and students crunch numbers, review notes and drawings, and analyze data. Results vary, depending on which park was visited, the time of the year, and the quality of data the students were able to collect. For example, in January, a group of students collected eight species of invertebrates. By May, other students had collected seventeen different species in the same



*Some of the things we've observed
raise important questions:*

*Why is there less variety of animals
in the schoolyard than in the park?*

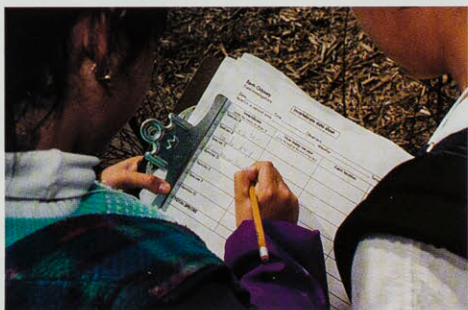
What could be done to change that?

Sarah Thompson,
Outreach Programs Manager

location, including a fairly large centipede, *Scolopendra polymorpha*, now a permanent member of the museum's Insect Zoo.

Sarah considers the follow-up visit to be an essential step in helping to clarify exactly what students did in the field and why. She believes it gets students thinking and serves to lock in the learning principles involved in scientific research. Plus it's an opportunity to focus on conservation efforts — a valuable part of relating the students' field experience to their perspective of everyday life.

Since its inception in 1999, *Earth Odyssey* has served over 1,500 students in 52 classrooms in the greater Los Angeles area. Many teachers are signing up for the program again next year.



GERARD FOSTER

"The *Earth Odyssey* program has been enthusiastically received by both teachers and students," Sarah reports. "For students not receiving science instruction, this has given teachers the tools they need."

Sarah envisions an exciting future for the program, including possible habitat restoration and working more closely with scientists to monitor an area over an extended period of time. Understanding biodiversity and how we can halt its decline keeps interest in the environment alive for these young explorers — not just during the school year but for a lifetime.

Kandi Gall is a freelance writer in Los Angeles.

For more information, please call the Outreach Programs office at 213/763-3344, or visit the *Earth Odyssey* website at www.earth-odyssey.org

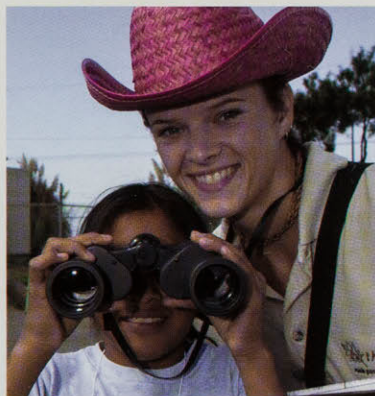
Earth Odyssey: The Teaching Moment

SHELBY IS A 10-YEAR-OLD 4th grader about to experience a moment of discovery.

She holds a vial with a squirming creature inside and with a quizzical look asks me, "What is THIS?" Another student from her science team, "The Rockets," squeals in fear at the sight of a leggy spider. I peer into the vial. "Hey! That's a male 'daddy long-legs.' You are the first one today to find one of these!" I point out the male's pedipalps, a specialized set of limbs used to capture food and for mating. The girls squirm and giggle while I urge them to note exactly where they found the invertebrate and to enter the information on the data sheet in their field notebooks. We continue to swish our insect nets through the tall grass.

Shelby and her classmates from Encino Elementary School are on a field trip in Griffith Park. These students learn that field research enables scientists to gain information about the environment in order to understand and preserve it. In the parks where students usually play basketball, they now stop to watch raptors soaring overhead and to listen to the insistent territorial chirp of male hummingbirds. They swing their collecting nets at western tiger swallowtails and monarch butterflies. Squirrels bury acorns and black phoebes dart after insects, undisturbed by students who are eagerly taking notes.

"Well, how many legs does it have? I can't



GERARD FOSTER

draw him 'cause he's jumping around too much," Shelby sighs. The students are drawing the invertebrates they have collected before releasing them. I tell Shelby that she has to count the legs herself. She uses a magnifying glass to examine the arachnid. "Wait! He only has seven legs!" I hold up the vial and count the legs with difficulty. "You're right! What

do you think happened to the other leg?" All eyes at the picnic table are now on the vial. "Maybe that's how many they have," one girl says doubtfully. "But I think they are supposed to have eight legs." I ask Shelby and the others in her science group to draw the daddy long legs exactly as they see it. Only when drawings are completed do we release the animals where they were collected.

Once students are aware of the rhythm of life around them, they realize they don't have to go to exotic environments to discover and observe the thousands of reptiles, insects, birds, and mammals that share our local surroundings, and that their numbers depend on the choices we make. Programs like *Earth Odyssey* may be among the first adventures for these explorers of tomorrow.

—Sarah Thompson, Outreach Programs Manager,
Natural History Museum of Los Angeles County



GERARD FOSTER

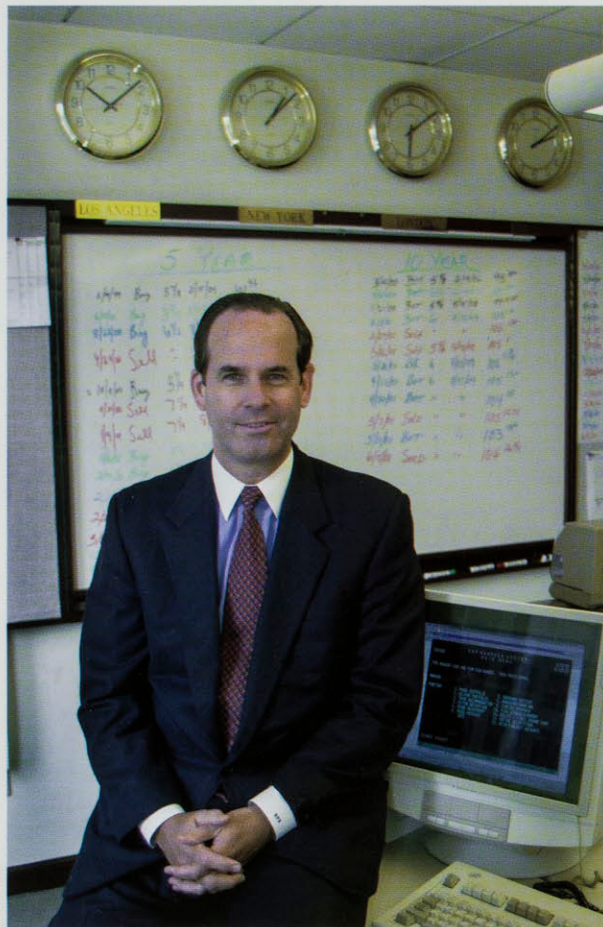
Museum on the Move

■ OF BOYS AND BUTTERFLY WINGS Greg Sanford and U.S. Trust—Making a Difference

What is Los Angeles? Ask third-generation-Californian Greg Sanford and he poses an interesting insight into why so many people outside of L.A. have the confused perception that we are all about Hollywood and freeways. "Our challenge here is that we have no easy, true identity to hang our hat on. How will others ever understand this notion of a collection or confederation of communities? We are hard to picture," says Sanford. "But there is a cultural renaissance afoot — engendered by new and reborn entities such as the Getty Museum, Staples Center, the ongoing research work at UCLA and USC, the Science Center, LACMA, the Natural History Museum — that is serving to establish an identity that will help others to know us. Throughout the world, great cities are known for their culture. We are now hard at work defining ours."

Sanford's use of "we" denotes a sense of community. President and Chief Executive Officer of the Western Region of U.S. Trust, he also serves on the Board of Trustees for the Natural History Museum and as the Chairman of its Advancement Committee. Community activism is central to the corporate philosophy of his company, one of the nation's premier investment and wealth management companies. "U.S. Trust is a firm believer in giving back and embracing the community. Any success we enjoy is because we serve the families here; we are part of the same fabric. Our senior professionals don't simply participate, they are actively involved," Sanford explains. "I believe in joining and serving non-profit causes for which you feel some passion. I've turned down board positions with wonderful, worthy organizations because they just don't resonate with me. You need to have your heart engaged."

In a city filled with art, music, science, and world-renowned medical research, how did a museum of natural history become the object of such passion? For Sanford, it had much to do with being a five-year-old boy awed by the depth and breadth of the planet. "On school field trips to the museum, I stood in wonderment in front of the exhibits. I guess I'm just wired that way. Other trips, science exhibits, didn't touch me; I was racing through the halls. But the Natural History Museum got to me, I was transported. It was my first sense of connection, an inkling of the idea that I fit somehow into the natural



world, along with all those wonders on display. Yet as an adult, I had never been back. What a loss! It just left the radar screen. When I was invited to consider serving on the museum board, it was an opportunity to get re-involved, after a gap of forty years. The museum needs people like me to care and step forward — so others don't miss or lose touch with that wonderment."

The reawakening of that sense of connection led Sanford to accept the board position, supported by a deep Los Angeles heritage (his grandfather was a teacher at Hollywood High) and broad financial services experience. He explains, "Giving is a lifetime experience. When you are young and funds are scarce, you give what you can. But if there are causes you care about, you look forward to the day when you can be more helpful. You dream of truly making a difference at some point. I welcomed this chance."

For the past three years, Sanford has contributed hundreds of hours to numerous museum board committees from public affairs to market-

ing and development, continually strengthening the museum's position within the community. "We are just starting to do a good job," he claims. "We are not at the point where every family knows the museum, but that is our goal. Once we nurture awareness here locally, we become part of the culture that rightfully puts us on the map for citizens around the world."

The Natural History Museum "does have greatness" according to Sanford, and there is still much to do to attain the standing its collections and distinguished staff deserve. Enrichment of the community, bringing the gift of knowledge to people of all ages and backgrounds, is intrinsic to the museum's mission. As its curators conduct laboratory and field research around the globe, their findings are shared with the public through education programs that include mobile learning, lectures, performances, workshops, and Sanford's well-remembered field trips.

A Corporate Partners Membership Program has been revitalized to provide the business community with access to executive lecture series, communication links to curators on major research expeditions, behind the scenes tours, employee family days at the three museum facilities, and other benefits that share the wealth of the museum's holdings.

U.S. Trust is a corporate partner, as are Nestlé Friskies Pet Care, Northrop Grumman Corporation, Amgen, Hitachi, and many others, each with their own motivation for the commitment. For Sanford, it is simple. "I envision employee passes and family days as the most valuable benefit for our company. We have 500 employees in the L.A. region and if even half of them come to consider the museum as a resource for entertainment and learning, then that factors down to a number of five-year-old boys standing in awe at a dinosaur or butterfly, or transported by a historic photograph of our town 150 years ago. That is the magic for me personally, that chance to pass on the connection."

Beth Parker is a freelance writer in Los Angeles.

■ New Assistant Curator of Malacology



Dick Meyer

The Natural History Museum is proud to welcome Dr. Angel Valdes as its new Assistant Curator of Malacology. Dr. Valdes, a native of Oviedo, Spain, received his doctoral degree from the University of Oviedo. He has

worked as Assistant Curator at the Musée National d'Histoire Naturelle in Paris, France, and most recently as a Senior Postdoctoral Fellow at the California Academy of Sciences in San Francisco. While at the California Academy of Sciences, he was actively involved in training students under the auspices of a National Science Foundation PEET grant (Partnerships for Expanding Expertise in Taxonomy) to study and describe new species of opisthobranch mollusks. Dr. Valdes is an internationally recognized authority on nudibranchs, commonly referred to as sea slugs and found primarily in warm tropical seas. His interest and expertise in these tropical mollusks promises to be a productive and significant fit with the museum's existing strengths in marine invertebrates. Dr. Valdes has extensive field experience collecting and describing nudibranchs from Spain, Costa Rica, Mexico, the Red Sea, and the Caribbean.

■ New Assistant Curator of Anthropology



Dick Meyer

Dr. W. Warner Wood received his Ph.D. in anthropology from the University of Illinois at Urbana-Champaign in 1997. As a cultural anthropologist, he specializes in Latin American culture and society with particular focus on indig-

enous Mexican cultural identity and material culture. He has worked with Zapotec weavers for more than a decade, and has conducted research in multiple locales including Oaxaca, Mexico City, and Tijuana, as well as the Santa Fe region of the American southwest. At the museum, Dr. Wood will assume responsibility for the promotion, interpretation and growth of the museum's

ethnographic collections from Latin America. He anticipates continuing his work with Zapotec weavers moving between field sites in Oaxaca and Southern California.

■ Research Grants to the Natural History Museum

❖ The Natural History Museum of Los Angeles County contains the country's second largest collection of crustaceans and is therefore a logical place for broad-based training of the scientists who study them. **Dr. Jody Martin**, Curator of Crustacea, has received \$149,476 in funding for the third year of a National Science Foundation (NSF) Partnerships for Expanding Expertise in Taxonomy (PEET) grant. The grant supports student training and systematic research in three broad areas of crustacean diversity: the Leptostraca, marine "water fleas;" the Brachyura, crabs; and the Conchostraca, freshwater "clam shrimps." Three doctoral students will be trained in morphological systematic research at the museum, complemented by molecular genetic studies at UCLA.

❖ **Dr. Martin** also received a grant from NSF in the amount of \$1,345,000 over five years to study the relationships of various groups of arthropods, including crustaceans, using molecular sequence data. This work will be conducted in collaboration with scientists at Duke University, the University of Maryland, and North Carolina State University.

❖ **Dr. Brian Brown**, Associate Curator of Entomology, has received a three-year research grant of \$140,000 from NSF to continue his work on the systematics of phorid flies. He will be studying the Central and South American genus *Melaloncha*, commonly called "bee-killing flies" for their parasitic way of life. The grant will be used for field work, including this year's expeditions to Peru and Bolivia, equipment, and part-time technical support.

❖ **Dr. Christine Thacker**, Assistant Curator of Ichthyology, has been awarded an NSF grant of \$205,000 to study the evolution and relationships of gobies, a group of more than 2,000 species of small fishes found throughout tropical, subtropical, and temperate regions, in freshwater and nearshore marine habitats. Dr. Thacker will use DNA sequence data, generated in the museum's Molecular Systematics Laboratory, to determine how the first gobies evolved and spread throughout the world. The award will

support lab and field work, and fund a postdoctoral scholar. This study will provide the first comprehensive analysis of the world's most common fishes, and serve as a framework for further studies of ecology, adaptation, development, and biogeography.

❖ The Getty Grant Program has awarded the Natural History Museum Foundation a \$300,000 grant to implement an electronic catalogue for six collection areas of the History Department's collections. The funds will allow the creation of an electronic catalogue for almost 55,000 items from both sections of the History Department's holdings: Material Culture and the Seaver Center for Western History Research. The six areas targeted for the project are art, aviation, exploration and travel, Hispanic California, moving image, and photographic collections. The ultimate goal is to have the department's entire collection of some 1.5 million items catalogued digitally, cross-referenced, and available online. For example, what is presently catalogued simply as a "Pathé motion picture camera" will soon link to records for both "Keystone Kops," for which the camera was used, and to filmmaker Mack Sennett. Researchers will discover that the filmmaker was a donor to the museum and, along with the camera, donated photographs of the camera in operation. The project's supervisor is **Dr. Janet R. Fireman**, Curator of History.

❖ With support from NSF, 17 North American institutions, including the Natural History Museum of Los Angeles County, are developing a network of databases of mammal specimen data. The main objective of this Mammal Networked Information System (MaNIS) is to access combined specimen data from participating institutions from a web browser. Development of MaNIS addresses the urgent call for natural history museums to come together to build and support a biodiversity informational infrastructure in an open, collaborative manner. This combined data will allow ready access to detailed knowledge about global biodiversity. This \$37,612 grant will be under the direction of **Dr. Inés Horovitz**, Assistant Curator of Mammalogy, and **Dr. John Heyning**, Deputy Director of Research and Collections and Curator of Mammalogy.

❖ The Getty Grant Program has awarded **Dr. Margaret Ann Hardin**, the museum's Curator of Anthropology, and co-collaborator **Dr. Zena Pearlstone**, Assistant Professor in Art History at California State University, Fullerton, and



Santa Barbara Mission by Edwin Deakin (1838–1923)

Research Associate at the museum, a \$140,900 Collaborative Research Grant to support their project, “Pueblo Artistic Routes: the Commodification of Hopi Katsinas and Zuni Fetishes.” The two team members will study present-day Zuni fetishes and Hopi katsinas as the culmination of a 150-year journey from a traditional village context to a modern market. The Getty advisory committee selected this study as offering an important contribution to the understanding of the history of art.

❖ The Seaver Center for Western History Research has been granted \$10,000 in funding from its founding benefactor, the Seaver Institute, for the planning phase of a larger project to digitally scan over 25,000 glass plate negatives from the Seaver Center’s collection. Once completed, thumbnail images and catalog data will be available to researchers at the center or via the Internet. The goal of the project is both to preserve the collection and to make it more accessible to researchers. The project will be under the direction of **Dr. Jonathan Spaulding**, Associate Curator.

❖ Through a special grant from the Andrew W. Mellon Foundation, **Dr. Don Reynolds**, Curator of Botany, and **Dr. Gregory Gilbert** of the University of California, Santa Cruz, will undertake a comparison of tropical leaf-surface fungi in Panama and Australia. The study is to expand our understanding of the microbiology of plant leaf surfaces and certain fungal preference for specific canopy tree species and even canopy

strata to complete their life cycles. This study is a novel approach to spatial patterns and host preferences of the lowland tropical canopy and combines Reynolds’ taxonomic expertise with Gilbert’s experience with fungal ecology.

❖ **Dr. Luis Chiappe**, Associate Curator of Vertebrate Paleontology, has received a \$4,000 grant from the Infoquest Foundation to continue his pioneering studies of dinosaur embryos recovered from nest sites in Patagonia. His work has been the basis for the museum’s world premier exhibit, *The Tiniest Giants: Discovering Dinosaur Eggs*.

■ Rededication of the California History Hall

The California History Hall, covering 400 years of the Golden State’s history and one of the museum’s most visited galleries, was rededicated on May 12, 2001 in ceremonies conducted at Celebración de California, the theme of this year’s Dinosaur Ball, the museum’s gala fundraising event. The culmination of months of behind-the-scenes work, the twenty-year-old exhibition hall re-opened to the delight of visitors, including a number of donors to the cause.

Originally dedicated in 1980 as the Maximilian N. Lando Hall of California and Southwest History, named for the Los Angeles optometrist who bequeathed funding that was used to build the hall, the exhibition was showing its age. With essential financial support from the Alliance Board, spearheaded by Bob Swartz, President, and board member Tani Sackler Krouse, staff from the museum’s exhibits, art, education, and history departments undertook the renovation that has resulted in a brighter, revitalized gallery.

Edwin Deakin’s beloved paintings of the 21 California missions—part of the history department’s collection for many years—have also been re-introduced to the public. Thanks to a generous donation from Trustee Lynne Brengel and her husband, these hundred-year-old paintings have been cleaned, stabilized, and fitted for new frames. Nineteen of them were on exhibit in the grand foyer of the museum, and two of the paintings, of the San Fernando mission and the San Gabriel mission, are on display in the mission section of the renovated California History Hall.

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Exhibitions

Vikings: The North Atlantic Saga November 17, 2001 through March 17, 2002 First Floor Special Exhibits Gallery



Vikings brings together for the first time more than 300 artifacts representing the many regions visited 1,000 years ago during the Vikings' westward expansion across the North Atlantic.

Among the treasures to be displayed are looted jewelry and silver hoards, pagan grave goods dated from A.D. 800 to 1050, looted jewelry, medieval church carvings dated from A.D. 1050 to 1400, and saga manuscripts from the 13th and 14th centuries.

The exhibition explores the historic impact of recent archaeological finds that reveal much about Viking shipbuilding, navigation and exploration, and which shed light on Viking contacts, trade and relations with European and Native American societies.

This exhibition has been made possible through the generous support of the Nordic Council of Ministers and Volvo. Additional support has been provided by Husqvarna Viking Sewing machines, Barbro Osher Pro Suecia Foundation, and Philips Petroleum Company Norway. Local sponsorship provided by AT&T Broadband and Scandinavian Airlines (SAS), the official airline of the Vikings exhibit. Presented by the National Museum of Natural History, Smithsonian Institution in partnership with the White House Millennium Council.

Of Myth and Memory: Paiute and Shoshone Baskets of Owens Valley, California

October 13, 2001 through April 14, 2002
Dart Gallery

This exhibit of Paiute and Shoshone baskets presents a social history of the Owens Valley in California. Living in the area for thousands of years, the Paiute and Shoshone tribes practiced a semi-nomadic lifestyle, which was beautifully expressed in the baskets they produced. Starting with the mid-nineteenth century arrival of non-Indians, traditional Paiute and Shoshone culture changed dramatically. Their ability to

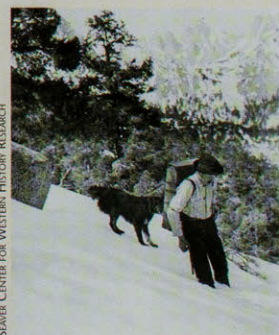
retain their cultural traditions while adapting to the exigencies of modern life can be traced through changes that occur in the materials, designs and functions of their baskets. This exhibit examines these changes and celebrates the legacy and culture that survived.

Supported in part by the Firman Fund and the S. Livingston Mather Charitable Trust. The Natural History Museum of Los Angeles County gratefully acknowledges the Los Angeles Department of Water and Power as a major local sponsor of this exhibit.



Our Verdant Valley: The Owens Valley Photographs of Andrew Forbes October 13, 2001 through April 14, 2002 Dart Gallery

As a companion exhibit to *Of Myth and Memory*, photographs from the Andrew A. Forbes collection document the people, industry, and landscape of the Owens Valley. After his arrival in 1902, Forbes became an active member of the Owens Valley community, and his photographs reveal the dramatic beauty of



the region and the profound physical and social changes it underwent.
Produced by the Natural History Museum from the Seaver Center for Western History Research's collection.

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The Natural History Museum exists to advance knowledge and to enable people of all ages, backgrounds, and interests to understand and appreciate their natural and cultural heritage. The museum assembles, conserves, interprets, and holds in trust collections of irreplaceable objects from nature and human history. These collections reveal the history of the Earth and the evolution and diversity of life and culture. They sustain programs of research, exhibits, education, and publication.

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